

Housing and Health

What is the direct impact of housing on health? Although the answer seems obvious, the scientific evidence is less clear-cut. Does overcrowding increase transmission of infectious diseases; does it lead to more clinical depression? Do damp and cold conditions increase wheezing and asthmatic symptoms? Living in poor quality housing tends to be part of a more generally disadvantaged life, so how can we disentangle the effects of poor quality housing from those of low income, hazardous work and life in a run-down neighbourhood? How long after moving in to poor housing do the effects on health become visible?

There is one non-contentious way in which poor quality housing impacts directly upon health: it leads to higher numbers of deaths in winter, mainly in older people. In the UK each winter 40,000 more people die than would happen if death rates during the rest of the year were maintained. The deaths are mainly from heart attacks, strokes or lung disease. Many of these would be prevented if people could keep warm, but this requires effective heating and insulation of homes. In 2002, 7% of England's over 60s were living in accommodation which lacked central heating; and, in 2006, 2.4 million households in England were in fuel poverty.

What of other scientific evidence? Randomised controlled trials (RCTs) are the study



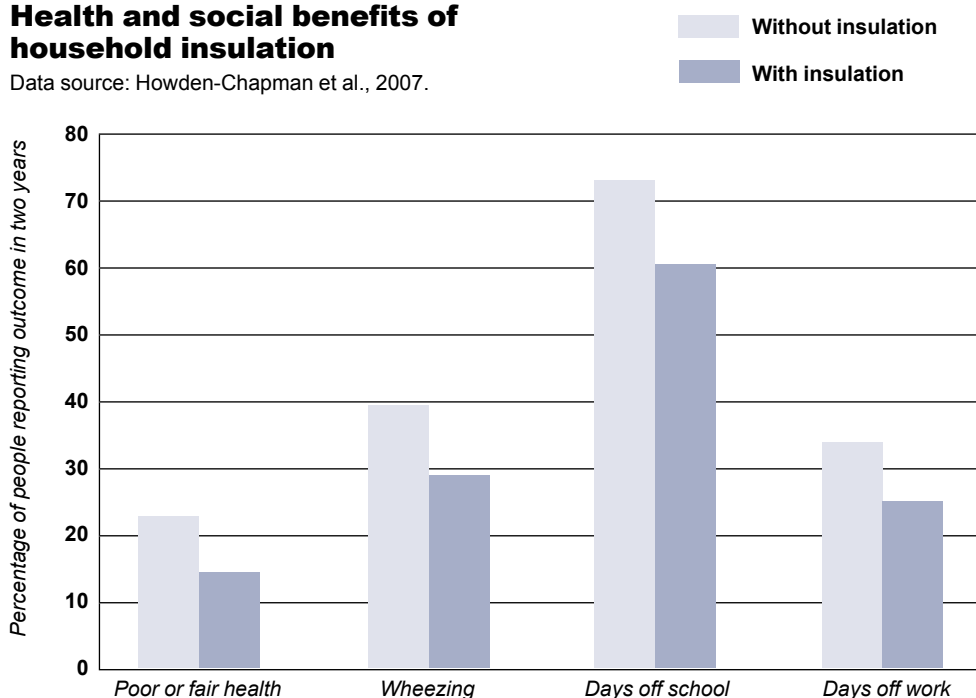
design needed to prove that something causes poor health. An RCT of housing requires people to be randomly allocated to different housing conditions, which is usually unfeasible. One RCT conducted recently, despite the difficulties, showed that installing housing insulation has health and consequent

social benefits (see graph and Study 4 overleaf). Where RCTs cannot be conducted, other types of study can answer the same questions, although each has its own particular strengths and weaknesses.

The wide range of symptoms reported by people living in poor housing raises doubts over whether it is housing itself which causes these problems. Nevertheless, the evidence points consistently to a relationship between damp, cold housing and heart and lung disease. This relationship: (a) fits the data on excess winter deaths, which mostly are due to cardio-respiratory disease; (b) shows a dose-response relationship – Study 1 overleaf; (c) remains when objective measures of health are used – Study 2 overleaf; and (d) is found in the few studies which have a design that can prove causality – Studies 3 and 4 overleaf.

Health and social benefits of household insulation

Data source: Howden-Chapman et al., 2007.



FURTHER READING

- Against the Odds*, B. Rice, Shelter, 2006
- The Living Standards of Children in Bad Housing*, M. Barnes et al., National Centre for Social Research, 2005
- What Happens to Children in Persistently Bad Housing?* M. Barnes et al., National Centre for Social Research, 2008
- Fuel Poverty and Health*, M. Smith et al., Faculty of Public Health, 2006

Housing and Health



STUDY 1 Measuring health and housing conditions independently

A relationship between housing conditions and health can be falsely observed if the two factors are not measured independently. Respondents in poor health may suspect their housing is the cause or unintentionally be encouraged to emphasise the poor quality of their accommodation. Clinical depression may produce low self-assessments of both housing and health.

Researchers in Study 1 employed surveyors to assess damp and mould in residents' homes and take air and mould samples, and a microbiologist to estimate spore counts. This avoided the

problem of self-assessment of housing conditions. Interviewers collected residents' reports of their symptoms and the information was collated only after all the data were collected.

Where homes were damp or mouldy adults more frequently reported aching joints, vomiting, backache, blocked nose, fainting, constipation and breathlessness, and parents more frequently reported that children suffered wheezing, sore throat, fever, headaches and coughs. Among adults, the frequency of reports of high blood pressure and breathlessness increased step by step with

the severity of poor housing conditions. This is a dose-response relationship.

The childhood symptoms associated with damp and mouldy housing are common manifestations of respiratory tract infection, while the adults' symptoms are more generalised. The results remained after controlling for possible alternative explanations (residential crowding, smoking, unemployment).

Platt *et al. British Medical Journal* 1989; 298:1673-1678.

STUDY 2 Using objective measures of health

Self-reports of health do not always correspond with objective health. People may feel healthy despite having a disease, and perception of symptoms can depend upon a number of factors other than health. These problems are avoided by the use of objective health measures, such as blood pressure and lung function. The Health and Lifestyle Survey collected these health measures and infor-

mation on the condition of the homes of a large representative sample of British people.

The physical characteristics of the home influenced its occupants' lung function; and did so even more strongly in areas of Britain where the climate is harsh. The combination of harsh climate and residence in poor quality housing also raised the risk of high blood pressure.

These results took account of other possible explanations like smoking, medications, obesity and alcohol consumption.

Mitchell *et al. International Journal of Epidemiology* 2002; 31:831-838. Blane, *et al. Journal of Epidemiology and Community Health* 2000; 54:745-749.

STUDY 3 An intervention study

It is difficult to establish causality when housing conditions and health are measured at the same time, as in the studies outlined above. Poor housing may cause poor health, but the reverse may be true or a third factor may both damage health and restrict housing choice. These alternative explanations can be disregarded if health is measured before and after a change in housing conditions.

The Scottish Executive's Central Heating Programme was designed to improve health by installing central heating to houses with residents aged over 60 years. Residents were interviewed

about their health before this intervention and two years later. A group of similar people were also interviewed for comparison.

After installation of central heating, damp and mould were reduced and the occupants of these homes were less likely than the comparison group to report having been diagnosed with heart disease or high blood pressure; no changes were found in respiratory disease. The researchers were cautious about their results, however, because two years may be too short a period for the full impact on heart disease and high blood pressure to appear.

The comparison group in this study were selected by a different process to those in the programme, and some had central heating. They were not, therefore, considered to be a control group and we cannot say definitively whether changes to health in the 'treated' group are due to the intervention or whether some other change in conditions led to the change in health.

Walker *et al. Journal of Epidemiology and Community Health* 2009; 63:12-17.

STUDY 4 A randomised control trial

With sufficient numbers of participants in an RCT, random allocation ensures that people in the intervention and control groups are similar in terms of possible confounding factors (e.g. social class, age, smoking habits), excluding other possible explanations for any changes observed.

Uninsulated homes in low income communities in New Zealand, with at least one occupant who had recently reported respiratory symptoms, were randomly allocated to have insulation installed, or have no changes made. The quality of housing was assessed by buildings inspectors and residents were

interviewed about their health before the intervention and two years later.

Insulation led to increased indoor temperatures and a decrease in humidity and reduced spending on heating. Before the intervention there were no substantial differences in the health of the two groups, but two years later fewer of the intervention group had visited a general practitioner, taken days off work or school or reported that their health was not good. In addition to the health benefits of installing insulation, there were economic savings of around double the cost of installation.

Neither the building inspectors nor the interviewers knew whether the houses had had insulation installed. Ideally, the residents would also not have known whether they were in the intervention group, but this was impracticable. It is possible, therefore, that some results relating to self-reported health measures were biased by the residents knowing whether their houses were insulated.

Howden-Chapman *et al. British Medical Journal* 2007; 334:460-468.